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Indian Standard
SPECIFICATION FOR LAMPS FOR FLASHLIGHTS
(First Revision)

UDC 621·326·75 : 628·944

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MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

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March 1976

AMENDMENT NO. 1 MAY 1986

TO

IS : 2261 - 1975 SPECIFICATION FOR LAMPS FOR FLASHLIGHTS

(First Revision)

(*Page* 5, *clause* **3.2**) — Substitute the following for the existing clause:

"**3.2** The dimensions of the cap shall be as given in the Article sheets 1 and 2 (Pages 8 and 9). The dimensions of the finished screw caps shall be checked with the help of ' GO ' and ' NO GO ' gauges specified in Appendix A."

(*Page* 6, *clause* **4.1.2**, *second sentence*) — Delete.

(*Page* 11, *clause* **6.4.1** *line* 2) — Substitute ' Appendix B ' *for* ' Appendix A '.

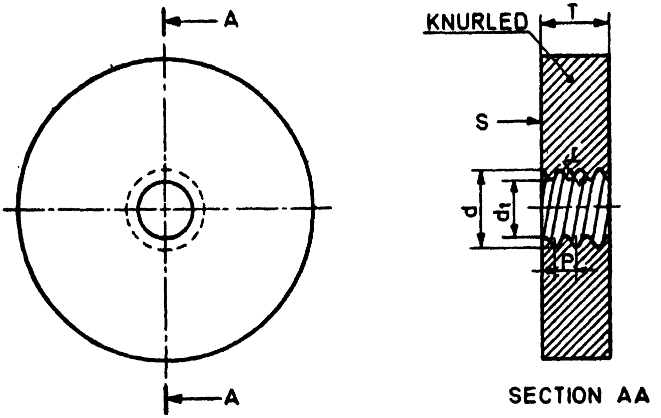
(*Page* 12, *clause* **7.2.3**) — Add the following new appendix after **7.2.3** and renumber the existing Appendix A as Appendix B:

‘APPENDIX A

(*Clause* 3.2)

‘GO’ AND ‘NO GO’ GAUGES FOR E 10 CAPS ON FINISHED LAMPS

A-1. ‘GO’ GAUGE FOR E 10 CAPS ON FINISHED LAMPS



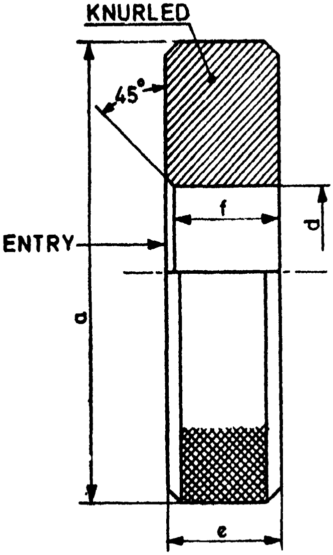
All dimensions in millimetres.

DIMENSION	E 10	TOLERANCE
d	9·53	+0·03 −0·0
d_1	8·51	+0·03 −0·0
P pitch	1·814	—
T	9·5	+0·0 −0·03
r radius	0·531	—

Purpose : For the control of thread and dimension T, *Min.*

Testing : The cap shall enter the gauge until the surface of the contact reaches or projects beyond surface S.

A-2. ' NO GO ' GAUGE FOR E 10 CAPS ON FINISHED LAMPS



All dimensions in millimetres.

Dimension	E 10	Tolerance
a	33	Approx
d	9·36	+ 0·0 – 0·01
e	13·5	+ 0·1 – 0·1
f	13	+ 0·1 – 0·1

Purpose **:** To control the minimum major diameter of the male screw threads.

Testing **:** The cap on the finished lamp shall be assumed to be correct if the gauge does not pass over the threads by its own weight.

IEC Ref No. 7006-27A-1 and 7006-28-4'

(ETDC 23)

Printed at New India Printing Press, Khurja, India

Indian Standard
SPECIFICATION FOR LAMPS FOR FLASHLIGHTS
(First Revision)

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(*Continued on page* 2)

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Indian Standard
SPECIFICATION FOR LAMPS FOR FLASHLIGHTS
(First Revision)

0. FOREWORD

0.1 This Indian Standard (First Revision) was adopted by the Indian Standards Institution on 26 November 1975, after the draft finalized by the Electric Lamps and Accessories Sectional Committee had been approved by the Electrotechnical Division Council.

0.2 This standard was first published in 1963. This revision has been undertaken with a view to up-dating many of the requirements of lamps for flashlights and also to line up the dimensions of caps in accordance with the latest IEC Recommendations. In this revision, requirements in respect of axial error have also been included.

0.3 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value of this standard.

1. SCOPE

1.1 This specification covers miniature tungsten filament lamps used for flashlights of prefocussed and focussing types.

2. TERMINOLOGY

2.0 For the purpose of this standard the definitions given in IS : 1885 (Part XVI/Sec 3)-1967† and the following shall apply.

2.1 Type — Lamps of the same general construction, intended to be identical in photometric and electrical ratings.

---

*Rules for rounding off numerical values (*revised*).

†Electrotechnical vocabulary: Part XVI Lighting, Section 3 Lamps and auxiliary apparatus.

2.2 Batch — All the lamps of one type put forward in a lot at one time for acceptance or all the lamps of one type which are subjected on one occasion to test for compliance with this standard.

2.3 Inspection Test Quantity (ITQ) — The number of lamps selected from a batch according to an agreed method, the tests on which shall determine whether or not the batch complies with the mechanical and physical requirements specified in **4.1** and marking requirements specified in **4.4**.

2.4 Rating Test Quantity (RTQ) — The number of lamps selected from a batch according to an agreed method, the initial rating tests on which shall determine whether or not the batch complies with the initial rating requirements specified in **4.2**.

2.5 Life Test Quantity (LTQ) — The number of lamps selected from a batch according to an agreed method, the life test and measurements for individual lumens at 75 percent life on which shall determine whether or not the batch complies with the life performance requirements specified in **4.3**.

2.6 Light Centre Length — The distance from the geometrical centre of the filament to a specified position on the lamp cap.

Note — For lamps covered by this standard, the geometrical centre may be taken as the tip of the filament as indicated in Fig. 1.

2.7 Prefocussed Type Lamps — Lamps in which the geometric centre of filament is fixed with respect to the flange of the cap (P 13.5 s) in the horizontal as well as the vertical axes within specified tolerances.

2.8 Focussing Type Lamps — Lamps in which the geometric centre of filament is fixed within specified tolerance only with respect to the horizontal axes of the cap (E10/13).

2.9 Lumen — Unit of luminous flux. It is equal to the flux emitted in a solid angle of one steradian by a uniform point source of one candela.

Note — The candela (abbreviation : cd) is the unit of luminous intencity. It is of a magnitude such that the luminance of a full radiator at the temperature of solidification of platinum is 60 units of luminous intensity per square centimetre.

2.10 Initial Readings — Photometric and electrical measurements made at the end of the ageing period.

2.11 Life of a Lamp — The number of hours in operation prior to burning out of the filament.

2.12 Rated Voltage — Voltage marked on the lamp.

2.13 Axial Error — Deviation (perpendicular distance) of the coil centre from the axis of the cap.

2.14 Standard Deviation (of a Group of Measurements) — The square root of the quotient obtained by dividing the sum of squares of the deviations of the individual measurements from their mean by one less than the number of measurements in the group.

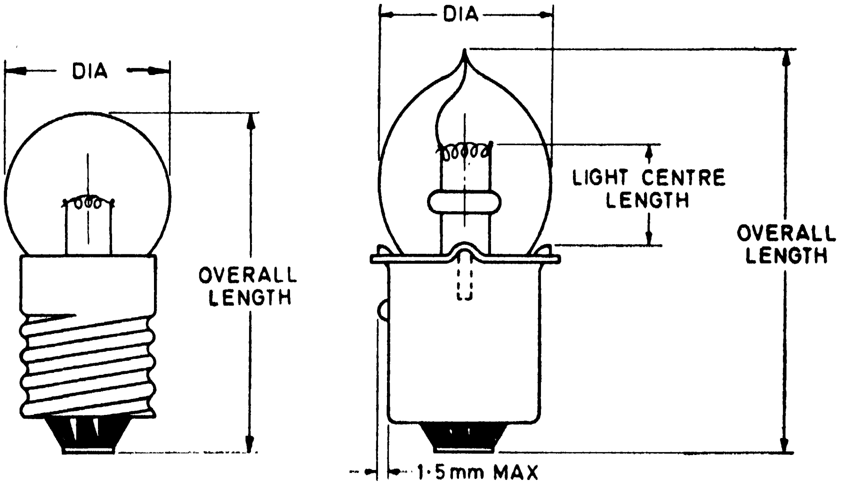
2.15 Average — Sum of the values of the measurements divided by the number of the measurements.

2.16 Coefficient of Variation (of a Group of Measurements) — The standard deviation expressed as a percentage of the average of the group of measurements.

3. SHAPE AND DIMENSIONS OF LAMPS AND LAMP CAPS

3.1 The typical shapes of lamp shall be as given in Fig. 1.

3.2 The dimensions of the cap shall be as given in the Article Sheets 1 and 2 (P 8 & 9).



1A Focussing Type **1B Prefocussed Type**

All dimensions in millimetres.

NOTE — Form of construction is typical but not obligatory.

FIG. 1 LAMPS FOR FLASHLIGHTS

4. REQUIREMENTS

4.1 Mechanical and Physical Requirements

4.1.1 *Bulbs* — The bulbs shall be clean, uncoloured and free from defects detrimental to service.

4.1.2 *Caps* — The shells of caps may be of any suitable metal, provided the caps are ordinarily resistant to atmospheric corrosion and withstand the test specified. Dimensions of the cap shall be in accordance with Article Sheets 1 and 2.

4.1.3 *Attachment of Caps to Bulbs*

4.1.3.1 The bulbs with Edison screw caps shall withstand a torsional moment of 0·2 N.m when tested in accordance with **6.3**.

NOTE — The torsional moment in case of prefocussed type shall be 0·1 N.m.

4.1.3.2 The cap outer surface should be free from cementing material so that it does not interfere with the proper engagement in the holder.

4.1.3.3 *Solder* — Solder shall be so applied as not to interfere with the proper engagement in the holder. The thickness of the side solder (blob) in the case of prefocussed lamps shall not exceed 1·5 mm.

4.1.4 *Axial Error* — The axial error shall not exceed 0·5 mm.

4.1.5 *Dimensions* — The dimensions shall be according to Table 1.

4.2 Initial Rating Requirements — The average initial current, the average initial lumens and coefficient of variation of the initial amperes and lumens, measured at the rated voltage in accordance with **6.4** shall comply with requirements given in Table 1.

4.3 Life Performance and Lumen Maintenance Requirements — The average life and the lumen maintenance at rated voltage, when tested in accordance with **6.5** shall be not less than those stated in Table 1.

NOTE — If a lamp does not comply with lumen requirements at 75 percent life, it should be considered to have failed at 69 percent of life.

4.3.1 The average life may be below the life specified by not more than 10 percent.

NOTE — This figure is the statistical allowance to take into account the small size of the sample taken for life test.

4.4 Marking

4.4.1 Each lamp shall be distinctly and indelibly marked with the following:

a) Manufacturer's trade-mark,

b) Rated voltage,

c) Rated initial current, and

d) Country of manufacture.

TABLE 1 REQUIREMENTS FOR LAMPS FOR FLASHLIGHTS

(*Clauses* 4.1.5, 4.2 *and* 4.3)

NO. OF CELLS AND TYPE (1)	RATED VOLTAGE (2) V	*INITIAL AVERAGE CURRENT (3) A	CAP (4)	DIAMETER (5) mm	OVERALL LENGTH (6) mm	LIGHT CENTRE LENGTH (7) mm	AVERAGE INITIAL LUMENS (8) *Min*	AVERAGE LIFE h (9)	LUMEN MAINTENANCE (10)	COEFFICIENT OF VARIATION OF INITIAL LUMENS AND CURRENT (11) *Max*
				Focussing Types						
2 × R14	2·3	0·27	E10/13	11 ± 1	23 ± 1	—	5	10	70	10
2 × R20	2·5	0·3	,,	,,	,,	—	6	15	70	
3 × R20	3·8	0·3	,,	,,	,,	—	10	15	70	
5 × R20	6·2	0·3	,,	15 ± 1	27 ± 1·5	—	21	15	70	
				Prefocussed Types						
2 × R14	2·3	0·27	P13·5s	11 ± 0·5	32 *Max*	6·25 ± 0·5	5	10	70	
2 × R20	2·5	0·3	,,	,,	,,	,,	6	15	70	
2 × R20	2·4	0·5	,,	,,	,,	,,	10	15	70	
3 × R20	3·8	0·3	,,	,,	,,	,,	12	15	70	
3 × R20	3·6	0·5	,,	,,	,,	,,	18·5	15	70	
5 × R20	6·0	0·5	,,	,,	,,	,,	33·5	15	70	

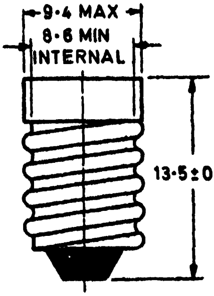
*Tolerance on initial average current rating is ± 10 percent.

Article Sheet No. 1
SCREW CAPS
E 10/13

Dimensions in millimetres.

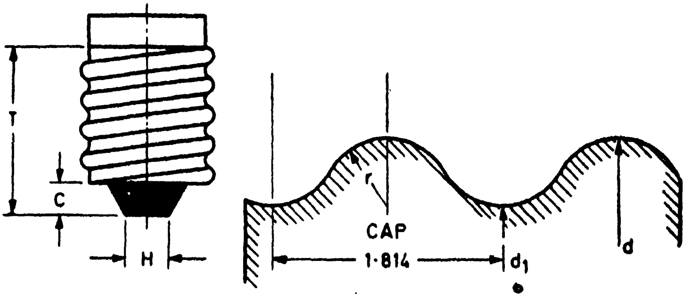
The drawings are intended only to indicate the dimensions to be controlled.

E 10/13



Caps may be made with a flare* the diameter of which shall be not more than 1 mm greater than the maximum permissible diameter of the corresponding cap without a flare.

For finished lamps the creepage distance over insulation shall be not less than 2 mm.



*These dimensions are solely for cap design and are not to be gauged on the finished lamp.

DIMENSION	MINIMUM	MAXIMUM
Cap C	Approx : 2·5*	
Cap H	3·5	4·0
Cap T†	9·5	—
Cap d	9·36	9·53
Cap d_1	8·34	8·51
r	0·531	

---

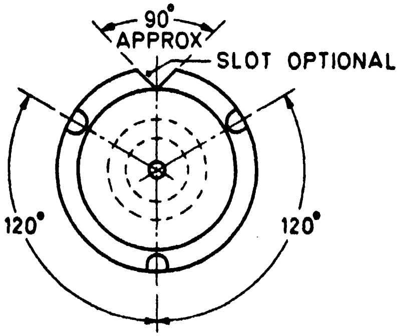
*These dimensions are solely for cap design and are not to be gauged on the finished lamp.

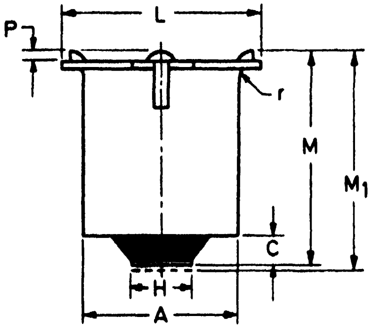
†'T' is the distance from the contact plate of the cap to the completion of the thread.

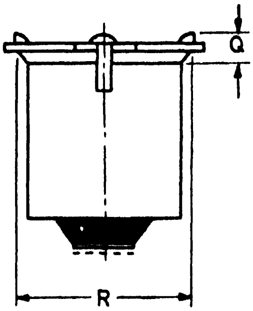
Article Sheet No. 2
PREFOCUS CAPS
P 13.5s

Dimensions in millimetres.

The drawings are intended only to indicate the dimensions to be controlled.







All other relevant dimensions identical

DIMENSION	MINIMUM	MAXIMUM
A	9·09	9·25
C	1·3*	—
H	3·5	4·0
L	13·39	13·54
M	13·90	14·40*
M_1	—	15·40
P	0·07	0·25
Q	—	2·0
R	—	11·3
r	—	12·0

---

*The sedimensions are solely for cap design and are not to be gauged on the finished lamp.

4.4.2 The following information shall appear on the carton or packing container:

a) Markings specified in **4.4.1**;

b) The type of lamp, namely, focussing type or prefocussed type; and

c) Symbol ' Fl ' to indicate that these are lamps for flashlights.

4.4.3 Lamps may also be marked with the ISI Certification mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

5. SELECTION OF LAMPS FOR TEST (SAMPLING)

5.0 General — Test quantities specified in **5.1**, **5.2** and **5.3** shall be selected at random from lamps belonging to one batch. The acceptance or rejection of the batch shall be determined on the basis of tests carried out on lamps selected from the batch (*see also* **7**).

5.0.1 *Batch Consisting of 1 000 Lamps or Less* — For batches consisting of 10 or less containers, lamps shall be selected from every container. If the batch consists of more than 10 containers, lamps shall be selected from at least one-half of the total number of containers in the batch with a minimum of 10 containers.

5.0.2 *Batch Consisting of More Than 1 000 Lamps* — Lamps shall be selected, as far as possible, from one-third of the total number of containers, with a minimum of 10 containers.

5.1 Inspection Test Quantity — Inspection test quantity (ITQ) shall consist of 50 lamps selected at random from a batch of 5 000 pieces or part thereof.

5.2 Rating Test Quantity — Rating test quantity (RTQ) selected from the lamps which have passed the inspection tests shall consist of 35 lamps.

5.3 Life Test Quantity — Life test quantity (LTQ) selected from the lamps which have passed the rating tests, shall consist of 25 lamps.

6. TESTS

6.1 Conditions of Testing

6.1.1 *Ageing* — Before the lamps are subjected to photometric tests for the first time they shall be aged for a period of 15 minutes at the rated voltage.

6.2 Visual Examination and Checking for Mechanical and Physical Requirements and Marking — Each lamp of the ITQ shall be examined visually as well as checked for physical and mechanical requirements detailed in **4.1** and marking requirements specified in **4.4**.

6.3 Torsion Test (for Lamps with Edison Screw Caps Only) — Lamps with Edison screw caps shall be inserted in a holder (*see* Fig. 2) and fixed to a suitable torsion testing machine and the test shall then be carried out by twisting the bulb. The torques shall not be applied suddenly but increased gradually to the moment specified in **4.1.3.1**.

6.3.1 This test shall be carried out before and after life test (*see* **6.5**).

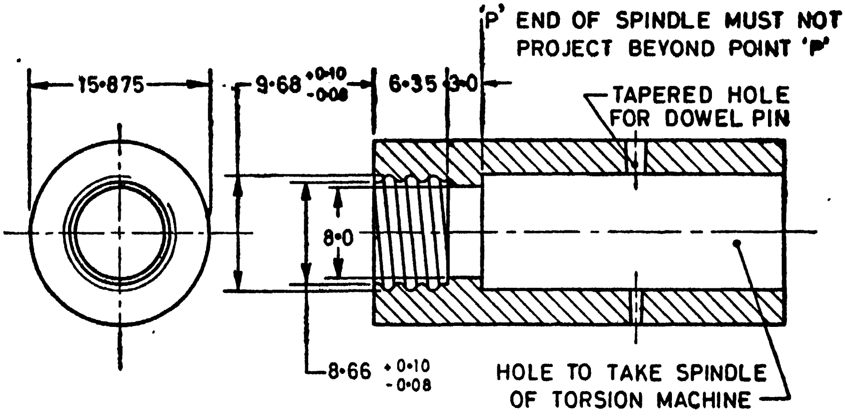

'P' END OF SPINDLE MUST NOT PROJECT BEYOND POINT 'P'
15·875
9·68 +0·10 -0·08
6·35
3·0
TAPERED HOLE FOR DOWEL PIN
8·0
8·66 +0·10 -0·08
HOLE TO TAKE SPINDLE OF TORSION MACHINE

FIG. 2 HOLDER FOR TORSION TEST

6.4 Initial Rating Tests — Measurements shall be made for initial current and initial lumens at rated voltage with an integrating photometer. The accuracy of the voltmeter and the ammeter, when used for the test, shall be not less than 0·2 and 0·3 percent respectively of the full scale values.

6.4.1 *Photometric Measurements* — A recommended photometric measuring procedure is given in Appendix A.

6.5 Life Test — The lamps for life test shall be burnt in any position at the rated voltage which should be kept constant within ±1·0 percent. The number of hours the lamp is on operation before the burning out of the filament shall be taken as life in hours of each lamp.

6.5.1 *Measurement of Lumen at 75 percent of Rated Life* — Each lamp of LTQ shall be tested for lumens at the rated voltage at the end of 75 percent of rated life.

NOTE — The tolerance for the measurement period shall be ± 30 minutes.

7. CONDITIONS OF COMPLIANCE

7.1 Individual Lamps — Any individual lamp shall be rejected if it fails to satisfy any of the requirements of **4.1** and **4.4**.

7.1.1 Such rejections shall be excluded from any subsequent tests.

7.2 Batches of Lamps — If any test quantity fails to satisfy any of the requirements of **7.2.1** to **7.2.3** the batch shall be rejected and no subsequent tests shall be carried out on samples selected from that batch.

7.2.1 *Mechanical and Physical Requirements and Marking* — A batch shall be considered to comply with the requirements of **4.1** and **4.4** if the number of lamps failing does not exceed the qualifying limits given below:

a) For any single requirement	*5 percent of ITQ + 1 lamp
b) For all requirements taken together	*15 percent of ITQ + 1 lamp

7.2.2 *Initial Rating Requirements*

7.2.2.1 *Initial current rating* — A batch shall be considered to comply with initial current rating requirements if the average initial current does not exceed the maximum value specified in Table 1.

7.2.2.2 *Initial lumen rating* — A batch shall be considered to comply with initial lumen rating requirements, if:

a) the average initial lumen of the batch shall be not less than the average minimum specified in Table 1, and

b) the coefficient of variation of initial lumen is equal to or less than the value specified in Table 1.

7.2.3 *Life Performance Requirements* — A batch shall be considered to comply with the life performance requirements, if:

a) the average life of the life test quantity attains the value specified in **4.3** with the allowance, and

b) the average lumen maintenance of the life test quantity is equal to or greater than the value specified in Table 1 subject to the allowance specified in **4.3**.

---

*In case of fraction resulting from this calculation, the next higher whole number shall be taken.

APPENDIX A

(*Clause* 6.4.1)

PHOTOMETRIC MEASUREMENT

A-0. GENERAL

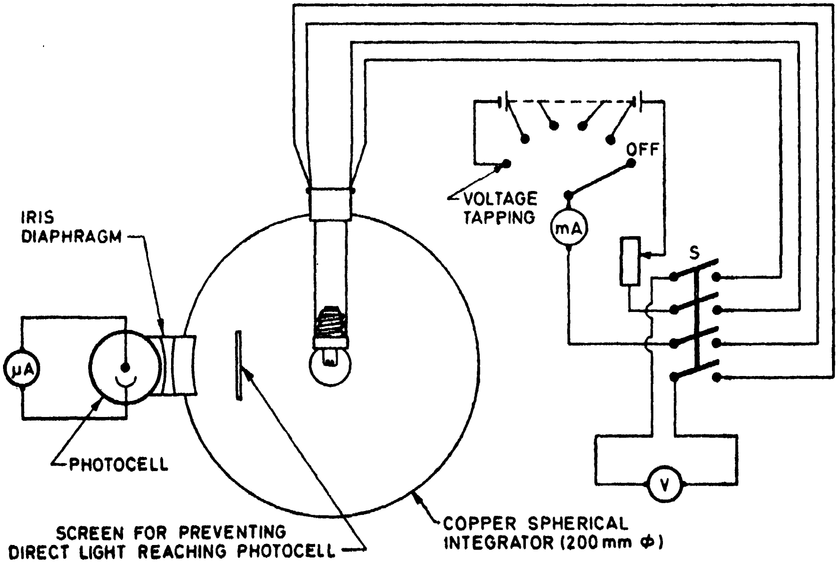
A-0.1 While the photometry of the lamps covered by this specification is not difficult, if reliable results are to be obtained, the measurements call for some care in the selection of suitable apparatus and the way in which it is used. A simple commercial apparatus is detailed below. In the measurement of lumen values, possible error may be avoided by the use of pure substitution methods to the greatest extent practicable.

A-1. DESCRIPTION

A-1.1 The integrating sphere used is about 200 mm in diameter and is constructed of two hemispherical copper 'springs' (bowls). The sphere should have an internal finish of matt neutral white of about 80 percent reflection factor. The sphere should also be fitted with the lamp holder, photocell, screen iris and microammeter.

A-2. ARRANGEMENT

A-2.1 The circuit arrangement of the photometer and electrical connections used shall be as shown in Fig. 3.


OFF
VOLTAGE TAPPING
mA
IRIS DIAPHRAGM
S
μA
PHOTOCELL
V
SCREEN FOR PREVENTING DIRECT LIGHT REACHING PHOTOCELL
COPPER SPHERICAL INTEGRATOR (200 mm ϕ)

NOTE — Leads should be as short as possible to avoid excessive voltage drop.

FIG. 3 SET-UP FOR LUMEN MEASUREMENTS

A-3. CALIBRATION

A-3.1 The sphere is calibrated by means of a suitable standardized lamp. This is placed in the holder which occupies the centre of the sphere and the voltage is adjusted to the correct value. The iris diaphragm, which is mounted directly in front of the photocell, is adjusted so that the amount of light falling on the photocell gives a deflection in microammeter which is in agreement with the lumen output of the standard lamp. As an example, if a standard lamp gives 17·4 lumen at 6 volts, the iris is adjusted so that the amount of light falling on the photocell gives a deflection of 174 divisions on the microammeter scale. The microammeter is thus calibrated to read directly in lumens.

A-4. MEASUREMENTS

A-4.1 After calibration, the standard lamp is removed and the lamp to be tested is placed at the correct position, the total lumens are read from the microammeter scale. The current taken by the lamp is also read from the ammeter in the circuit.

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418-1963	Tungsten filament general service electric lamps (*second revision*)
897-1966	Tungsten filament electric lamps for railway rolling stock (*first revision*)
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1901-1961	Visual indicator lamps
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INDIAN STANDARDS INSTITUTION
Manak Bhavan, 9 Bahadur Shah Zafar Marg, NEW DELHI 110002
Telephone : 27 01 31 (20 lines) **Telegrams : Manaksanstha**

Regional Offices:			Telephone
Western :	Novelty Chambers, Grant Road	BOMBAY 400007	37 97 29
Eastern :	5 Chowringhee Approach	CALCUTTA 700072	23-08 02
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Branch Offices:		
'Pushpak', Nurmohamed Shaikh Marg, Khanpur	AHMEDABAD 380001	2 03 91
'F' Block, Unity Bldg, Narasimharaja Square	BANGALORE 560002	2 76 49
Kothi No. 90, Sector 18A	CHANDIGARH 160018	2 83 20
5-8-56/57 Nampally Station Road	HYDERABAD 500001	4 57 11
117/418 B Sarvodaya Nagar	KANPUR 208005	82 72
B.C.I. Bldg (Third Floor), Gandhi Maidan East	PATNA 800004	2 56 55

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